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FILE 'USPAT' ENTERED AT 14:36:54 ON 08 JUN 96
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*           W E L C O M E   T O   T H E           *
*           U . S .   P A T E N T   T E X T   F I L E           *
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=> s natural rubber#

216768 NATURAL

233430 RUBBER#

L1 14812 NATURAL RUBBER#

(NATURAL(W)RUBBER#)

=> s graft# or grafted or grafting

20793 GRAFT#

11454 GRAFTED

9509 GRAFTING

L2 27546 GRAFT# OR GRAFTED OR GRAFTING

=> s methylmethacrylate or methyl meth acrylate or methyl methacrylate or  
methylmeth acrylate

6552 METHYLMETHACRYLATE

241320 METHYL

13391 METH

55836 ACRYLATE

1248 METHYL METH ACRYLATE

(METHYL(W)METH(W)ACRYLATE)

241320 METHYL

54891 METHACRYLATE

30301 METHYL METHACRYLATE

(METHYL(W)METHACRYLATE)

52 METHYLMETH

55836 ACRYLATE

24 METHYLMETH ACRYLATE

(METHYLMETH(W)ACRYLATE)

L3 34339 METHYLMETHACRYLATE OR METHYL METH ACRYLATE OR METHYL METHAC  
RYL

ATE OR METHYLMETH ACRYLATE

=> s l1(l)l2(l)l3

L4 740 L1(L)L2(L)L3

=> s l1(p)l2(p)l3

L5 121 L1(P)L2(P)L3

=> s deproteiniz##### or deproteinis#####

632 DEPROTEINIZ#####

56 DEPROTEINIS#####

L6 681 DEPROTEINIZ##### OR DEPROTEINIS#####

=> s l5(l)l6

L7 1 L5(L)L6

=> d 17 cit 1

1. 3,661,674, May 9, 1972, METHOD FOR THE MANUFACTURE OF FLEXIBLE SHEET MATERIALS; Maurice William Higgs, et al., 156/280, 148, 254; 427/430.1, 439; 428/234, 235, 289, 296, 297, 301, 302, 304.4, 904 [IMAGE AVAILABLE]  
=> d 17 fro 1

US PAT NO: 3,661,674 [IMAGE AVAILABLE] L7: 1 of 1  
DATE ISSUED: May 9, 1972  
TITLE: METHOD FOR THE MANUFACTURE OF FLEXIBLE SHEET MATERIALS  
INVENTOR: Maurice William Higgs, Pelsall, England  
Dennis Ivor Clarke, Erdington, England  
ASSIGNEE: Dunlop Holdings Limited, London, England  
APPL-NO: 05/079,679  
DATE FILED: Oct. 9, 1970  
REL-US-DATA: Continuation of Ser. No. 625,002, Mar. 22, 1967,  
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FRN-PRIOR: Great Britain 15,413/66 Apr. 6, 1966  
INT-CL: B32b 31/12; B32b 31/26  
US-CL-ISSUED: 156/280; 117/104, 121.2, 135.5, 140; 156/148, 254;  
161/151, 154, 155, 156, 159  
US-CL-CURRENT: 156/280, 148, 254; 427/430.1, 439; 428/234, 235, 289, 296,  
297, 301, 302, 304.4, 904  
SEARCH-FLD: 117/98, 104, 121.2, 135.5, 140; 156/148, 254, 278, 280;  
161/151, 154, 155, 156, 159, 170  
REF-CITED:  
U.S. PATENT DOCUMENTS  
3,193,437 7/1965 Schafer 161/89  
ART-UNIT: 164  
PRIM-EXMR: William A. Powell  
LEGAL-REP: Stevens, Davis, Miller & Mosher

ABSTRACT:

To form a flexible leather-like sheet material a compressed sheet of cellular material is adhered to one or each surface of the resulting assembly, the binder is allowed to permeate and impregnate the assembly and the impregnated assembly is heated to set the binder. The term "fibrous material" is broadly defined in order to include also cellular non-fibrous materials.

13 Claims, No Drawings

=> d 17 kwic

US PAT NO: 3,661,674 [IMAGE AVAILABLE] L7: 1 of 1

SUMMARY:

A . . . of a fibrous or cellular material. The adherence may be attained by means of a suitable adhesive, for example a **\*\*natural\*\*** **\*\*rubber\*\*** latex (especially a **\*\*deproteinized\*\*** **\*\*natural\*\*** **\*\*rubber\*\*** latex), a polychloroprene latex, an ethylene/vinyl acetate copolymer adhesive, a latex of a **\*\*graft\*\*** copolymer of **\*\*natural\*\*** **\*\*rubber\*\*** and poly(**\*\*methyl\*\*** **\*\*methacrylate\*\***), a solvent-based neoprene adhesive, a polyurethane adhesive or a carboxylated styrene/butadiene copolymer latex. Alternatively, the surface of the compressed sheet. . .  
=> d 15 cit 1-121

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3. 5,466,757, Nov. 14, 1995, Process for production of chlorinated ethylene-propylene copolymers; Naotoshi Watanabe, et al., 525/352; 524/201, 211, 424, 425, 430; 525/263, 334.1, 356, 358, 368, 369 [IMAGE AVAILABLE]
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melt flow for complex moldings; Bennett N. Epstein, 525/66; 524/504, 514; 525/179, 182, 183, 184 [IMAGE AVAILABLE]

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42. 4,656,070, Apr. 7, 1987, Coextruded recoverable articles; David D. Nyberg, et al., 138/141, 99; 156/52, 86, 244.13, 244.24; 174/DIG.8; 428/34.9 [IMAGE AVAILABLE]
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51. 4,468,436, Aug. 28, 1984, Magnetic recording material; Tsutomu Okita, et al., 428/423.3; 360/131, 134; 427/131, 502, 506; 428/425.9, 520, 694BC, 694BS, 694TS, 900 [IMAGE AVAILABLE]
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55. 4,420,573, Dec. 13, 1983, Method of treating water-in-oil dispersions; Sidney G. Fogg, et al., 523/333; 210/924, 925; 523/334, 335, 336, 339; 524/917 [IMAGE AVAILABLE]
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83. 4,016,665, Apr. 12, 1977, Signboard using macromolecular elastomer having adhesive layer; Mitsushi Sakota, 40/582, 594; 428/343 [IMAGE AVAILABLE]
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112. 3,650,911, Mar. 21, 1972, METALLIZING SUBSTRATES; Kingso Chingtsung Lin, 205/159, 163, 166, 183; 427/307, 322, 404 [IMAGE AVAILABLE]
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116. 3,642,584, Feb. 15, 1972, PROCESS FOR METAL PLATING OF SUBSTRATES; Edward J. Quinn, et al., 205/167; 106/1.25; 205/159, 166, 168, 183; 427/304 [IMAGE AVAILABLE]
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118. 3,620,834, Nov. 16, 1971, METAL PLATING OF SUBSTRATES; James J. Duffy, 428/461; 205/166; 427/306, 383.1, 383.5; 428/462, 463 [IMAGE AVAILABLE]
119. 3,616,295, Oct. 26, 1971, LOW-TEMPERATURE TRANSFORMATION OF NONCONDUCTIVE SUBSTRATES TO CONDUCTIVE SUBSTRATES; Sung K. Lee, 205/166, 159, 183 [IMAGE AVAILABLE]
120. 3,607,498, Sep. 21, 1971, METHOD OF PRODUCING TIRES HAVING DECORATIVE SIDEWALLS; Hirokazu Kubota, 156/116; 152/523, 524, DIG.10; 428/913 [IMAGE AVAILABLE]
121. 3,607,351, Sep. 21, 1971, PROCESS FOR METAL PLATING OF SUBSTRATES; Sung Ki Lee, 427/306; 106/287.18, 287.19, 287.24, 287.25, 287.28, 287.29, 287.3, 287.32; 205/166, 169; 427/404 [IMAGE AVAILABLE]

## SUMMARY:

## BSUM(2)

**\*\*Graft\*\*** copolymerisation of vinyl monomers onto **\*\*natural\*\*** **\*\*rubber\*\*** has been extensively studied in the past. The work has resulted in commercial production of materials known as Heveaplus MG which contain **\*\*natural\*\*** **\*\*rubber\*\***-**\*\*methyl\*\*** **\*\*methacrylate\*\*** **\*\*graft\*\*** copolymer. Such materials have achieved some commercial success; but this has been limited by the difficulty of controlling the reaction of the **\*\*methyl\*\*** **\*\*methacrylate\*\*** with the rubber and the properties of the resulting product. The present invention adopts the alternative approach of reacting pre-formed side chains with the rubber molecules and this provides greater control of the structure of the **\*\*graft\*\*** copolymer

## SUMMARY:

## BSUM(3)

In general, the properties of polymers can be modified more or less by **\*\*grafting\*\*** a monomeric component to the polymers and the resulting **\*\*graft\*\*** copolymers are themselves useful as moldable resins with improved properties for further processing or are suitable, in combination with a . . . agent for resins, metals, fibers, glass and the like materials or as a binder for these materials. In fact, the **\*\*graft\*\*** polymerization of **\*\*methyl\*\*** **\*\*methacrylate\*\*** to **\*\*natural\*\*** **\*\*rubber\*\*** is adopted in the prior art as a means for improving the physical and electrical properties of **\*\*natural\*\*** **\*\*rubber\*\*** at high temperatures. However, such known **\*\*graft\*\*** copolymer was not satisfactory in thermoageing-resisting, weather-resisting and ozone-resisting properties because of the reason that the **\*\*natural\*\*** **\*\*rubber\*\*** structure constituting the backbone of such **\*\*natural\*\*** **\*\*rubber\*\***-**\*\*methyl\*\*** **\*\*methacrylate\*\*** **\*\*graft\*\*** copolymer contains unsaturated bonds.

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=> s polymeriz##### or polymeris#####
      113838 POLYMERIZ#####
      8120 POLYMERIS#####
L8      119083 POLYMERIZ##### OR POLYMERIS#####
=> s l2(3a)l8
L9      5164 L2(3A)L8
=> s l9(p)l1
L10     114 L9(P)L1
=> s l10(l)l3
L11     82 L10(L)L3
=> s l10(p)l3
L12     19 L10(P)L3
=> d l12 cit 1-19

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2. 5,466,757, Nov. 14, 1995, Process for production of chlorinated ethylene-propylene copolymers; Naotoshi Watanabe, et al., 525/352; 524/201, 211, 424, 425, 430; 525/263, 334.1, 356, 358, 368, 369 [IMAGE AVAILABLE]
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6. 5,253,691, Oct. 19, 1993, Tire having specified belt rubber composition; Richard M. Sriver, 152/537, 564 [IMAGE AVAILABLE]
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16. 3,981,958, Sep. 21, 1976, Graft copolymers and process for producing  
same; Kunihiro Nakashima, et al., 525/265; 428/31; 525/289, 310 [IMAGE  
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DIG.12; 428/913 [IMAGE AVAILABLE]

19. 3,607,498, Sep. 21, 1971, METHOD OF PRODUCING TIRES HAVING  
DECORATIVE SIDEWALLS; Hirokazu Kubota, 156/116; 152/523, 524, DIG.10;  
428/913 [IMAGE AVAILABLE]

US PAT NO: 5,115,021 [IMAGE AVAILABLE]

L12: 10 of 19

DETDESC:

DETD(5)

MG 30 and MG 49 are each a graft copolymer obtained by \*\*graft\*\*  
\*\*polymerising\*\* \*\*methyl\*\* \*\*methacrylate\*\* in \*\*natural\*\* \*\*rubber\*\*  
latex and containing, respectively, nominal proportions of 30 and 49% by  
weight of poly(\*\*methyl\*\* \*\*methacrylate\*\*). They have been obtained from  
the Rubber Research Institute of Malaysia, PO Box 150, Kuala Lumpur,  
Malaysia.

DETDESC:

DETD(9)

The . . . agent to be used for the formation of the undercoating layer 11 may be a mixture of 100 parts of \*\*natural\*\* \*\*rubber\*\*, 30 parts of \*\*methyl\*\* \*\*methacrylate\*\* and 500 parts of toluene, or a solution prepared by mixing 20 parts of \*\*methyl\*\* \*\*methacrylate\*\*, 20 parts vinyl acetate monomer and 500 parts of toluene with 100 parts of chloroprene rubber with stirring at 80.degree.C for about 8 hours to carry out \*\*graft\*\* \*\*polymerization\*\* and dissolving the polymerization product in 500 parts of methyl ethyl ketone.

=> d 15 cit 68,87

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87. 3,981,958, Sep. 21, 1976, Graft copolymers and process for producing same; Kunihiro Nakashima, et al., 525/265; 428/31; 525/289, 310 [IMAGE AVAILABLE]

=> d 112 6,10,18

6. 5,253,691, Oct. 19, 1993, Tire having specified belt rubber composition; Richard M. Sriver, 152/537, 564 [IMAGE AVAILABLE]

10. 5,115,021, May 19, 1992, Pneumatic tires; Robert J. Blythe, et al., 525/84; 152/209R; 525/78 [IMAGE AVAILABLE]

18. 3,729,041, Apr. 24, 1973, TIRE; Hirokazu Kubota, 152/523, 524, 525, DIG.12; 428/913 [IMAGE AVAILABLE]

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=> d his

(FILE 'USPAT' ENTERED AT 14:36:54 ON 08 JUN 96)

L1 14812 S NATURAL RUBBER#  
L2 27546 S GRAFT# OR GRAFTED OR GRAFTING  
L3 34339 S METHYLMETHACRYLATE OR METHYL METH ACRYLATE OR METHYL MET  
HAC  
L4 740 S L1(L)L2(L)L3  
L5 121 S L1(P)L2(P)L3  
L6 681 S DEPROTEINIZ##### OR DEPROTEINIS#####  
L7 1 S L5(L)L6  
L8 119083 S POLYMERIZ##### OR POLYMERIS#####  
L9 5164 S L2(3A)L8  
L10 114 S L9(P)L1  
L11 82 S L10(L)L3  
L12 19 S L10(P)L3  
L13 82 S L11(L)L1